Emergent Structures in Dissipative Wave-Particle Systems\textsuperscript{1}

DAVIT SIVIL, ALFRED HUBLER, Center for Complex Systems Research, Department of Physics, University of Illinois at Urbana-Champaign — We study the motion of a particle with mass $m$ on a vibrated string of length $L$. We assume there is no friction force between the particle and the string. The string is sinusoidally forced at both ends. We find that the particle has attractors located at $x=L/2 - n\pi c/2\omega$, where $\omega$ is the frequency of the waves on the string, and $n \in \mathbb{Z}$. We also study the same system with friction and multiple driving frequencies. We also compared our results with numerical simulations.

\textsuperscript{1}The research is supported by the National Science Foundation Grant No. NSF PHY 01-40179, NSF DMS03-25939, ITR, and NSF DGE 03-38215.